

THE NEXT PRESIDENT OF THE UNITED STATES OF AMERICA WILL CONTROL A \$150 BILLION ANNUAL RESEARCH BUDGET, 200,000 SCIENTISTS, AND 38 MAJOR RESEARCH INSTITUTIONS AND ALL THEIR RELATED LABS. THIS PRESIDENT WILL SHAPE HUMAN ENDEAVORS IN SPACE, BIOETHICS DEBATES, AND THE ENERGY LANDSCAPE OF THE 21ST CENTURY.

DR. PRESIDENT

BY CHRIS MOONEY

During the past seven years of the Bush administration, America has been subject to what can only be called antiscientific governance. Scientists have been ignored, threatened, suppressed, and censored across agencies, across areas of expertise, and across issues. Policies have

gone forward repeatedly without adequate scientific input and sometimes in spite of it, and have subsequently backfired.

The picture couldn't have been any more stark this past summer, when former US Surgeon General Richard Carmona testified before Congress that he'd been blocked by the Bush administration from offering his expertise on issues ranging from embryonic stem cell research to mental-health problems emerging in the wake of the 9/11 terrorist attacks. To hear Carmona relate his experiences not only stirred outrage; his testimony further inspired an already powerful demand for change. Under George W. Bush—the man who

pronounced climate science “incomplete,” who misled the nation in his first major address about the availability of embryonic stem cells for research, who claimed that Iraq was collaborating with Al Qaida—America's relationship with *reality itself* has reached a nadir.

At the same time—and perhaps not coincidentally—the fortunes of the nation have suffered, and the prospects of many Americans, of the American Dream itself, have diminished. From bridge collapses to the failure to protect New Orleans (both before and *after* Katrina), these days the country can't even seem to deliver upon the most basic of promises to its citizens—to ei

sure their safety. Along with the neglect of science has come a broader neglect of expertise, competence, and even functional government. These are, perhaps, matters not so disparate. For science doesn't merely provide a way of expanding knowledge of the world. It doesn't just provide answers to pressing questions; it *changes* the conversation itself. Science—and the broader way of thinking that comes with it—trains its adherents and practitioners to relish the very act of questioning for its own sake, of figuring out what's true and false, of determining what works and what fails. Science can detect dark matter and dark energy; it can also build you dependable levers. By awakening to the full political implications of science and scientific thinking, the current crop of presidential candidates will stand a far better chance of being able to steer America back along the right course. The political currents are in place for a true scientific revival in this country, and Americans have the unique chance to host an election process that adds, rather than detracts from the public's general understanding of all things scientific. Tired of Bush, Americans now have the opportunity to elect a new leader who is his antithesis—a president who understands how science works, and who surrounds himself with trusted science experts so as to remain continually informed; one who grasps that scientific uncertainty is a fundamental facet of reality to be embraced, rather than to be exploited as an excuse for political inaction.

Indeed, voters should empower a president, Democrat or Republican, who uses the office to reverse the current administration's disturbing legacy and introduce the spirit of science into politics. The unrivaled platform enjoyed by a US president today confers the unique ability, upon a single individual, to achieve such a transformation and to alter the very zeitgeist of the nation, and even that of the world.

Americans desperately need to be encouraged once again, as they were at other times in the nation's history, to take an interest in the vital, exploratory world of science. The next president must foster that interest. Scientific information

and scientific thinking, after all, are critical to the type of informed decision making that resides at the heart of a democracy. To be sure, the spread of technocratic knowledge among voting citizens is extraordinarily difficult to achieve. However, a great leader should stir citizens to aspire to the very rationality, logic, and reason on which the scientific method is based. Americans' public health, job security, well-being, defense, and quality of life depend on an ability to do just that. So does the nation's standing as a global power.

Indeed, a new president should embrace the language and values of science not out of idealism, but rather as the highest form of pragmatism. Policies work best when the best informa-

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questions. Will space become militarized, or remain a neutral zone of unfettered international access? Will we successfully protect our populations and cities from the threats of nuclear and biological terrorism, as well as from emerging pandemics? Can we bring the AIDS crisis in Africa under control? How can we foster continuing biomedical advancement without crossing moral lines?

Will there be enough jobs available to employ the nation's scientists? If foreign researchers are better qualified for those jobs, will they receive visas so that US companies can benefit from their skills? And what of research in areas of pure science? As Europe's Large Hadron Collider at CERN in Geneva—the world's most powerful particle accelerator—heads toward a slated May 2008 start-up, will the US revisit the idea of building its own collider, and willingly take on that next phase of research into the very nature of matter? More important, will the next president understand the significance of such scientific questing? And if so, will he or she also know how to tell that story to the public?

Watching as the issues of the future career toward us, a true national leader will recognize the moral imperative to take what we know from (and about) science and use that knowledge to build a better and smarter America. That's not to say the next president must be a scientist. Being able to talk shop with the NIH lab workers isn't a job requirement. It's far less important that the next president know any field of science in depth than that he or she knows how to *learn*—how to become informed about scientific or technical subjects where there's often much uncertainty and yet also a pressing need for a policy decision.

At the same time, the next president must also recognize the centrality of scientific information and leadership to success in today's global economy. Setting the right policies for science in the US will prime and drive the nation's economic engine for decades to come. At a time when economists agree that innovation fuels growth, the US finds itself importing more high-tech goods from the rest of the world than it is ex-

porting. More low-tech than high-tech jobs are being created in this country; other nations, like South Korea, Singapore, and China, are producing a far higher percentage of natural science and engineering graduates. Bill Gates expresses this broad concern when he says: "When I compare our high schools with what I see when I'm traveling abroad, I am terrified for our workforce of tomorrow."

Indeed, the economic centrality of science and technology overlaps inextricably with international affairs. In the coming decades, China and India in particular are forecast to grow into major centers for innovation. China, powered by a leadership determined to achieve scientific advancement, is now second only to the US in its annual investment in research and development. India, meanwhile, is churning out 2.5 million science and engineering graduates per year. To successfully guide the US into the 2010s, the next president must understand the trends that are transforming these nations into key US competitors and have a plan for keeping pace with them—while simultaneously *avoiding* shallow nationalistic rivalry. The advancement of science is not a zero sum game.

To carry an awareness of science's centrality to politics and to economic growth into successful leadership the next president can contemplate several models from America's political past—one unsuccessful, two legendary. First the failed precedent: A good science president mustn't come across as an Adlai Stevenson-like figure, an "egghead." Americans don't like politicians who talk down to them, who exude clinical rationality but can't connect to average people. The president must instead take up the charge of science evangelist with authentic passion and emotion, making wonderment itself a means of communication. He or she must also help citizens understand why science matters in their own lives: For example, we all benefit from biomedical research, which ought to broaden the treatment options that any one of us might need someday. Other facets of science have very specific implications for particular regions of the United States: Floridians, for instance, rely upon science to tell them how hurri-

Americans could put a man on the moon, and the Apollo program, started on his watch, ultimately fulfilled his vision. We need our next president to become the Eisenhower, the Kennedy, of the 21st century.

The quest to become such a figure will certainly start on the campaign trail, where candidates may decide to define themselves as the *antidote* to George W. Bush's anti-empirical leadership. But the scientific mission ramps up after the election, when the time comes to set a government in place. In this context, the newly elected president must repeatedly signal, in both symbolic and substantive ways, that when it comes to science, things are going to be done differently.

Appointing appropriate heads of science agencies, and in a timely fashion, is imperative. In the last administration, the National Institutes of Health and the Food and Drug Administration—two vital government agencies employing hordes of scientists—were leaderless for a year. Bush delayed nearly as long in naming a presidential science adviser and director of the Office of Science and Technology Policy. Indeed, Bush science adviser John Marburger wasn't confirmed by the Senate until nearly a year into the presidency and, when confirmed, the message to scientists, and to the nation they serve was: *We don't really need you. We're just going through the motions.*

To set a different tone, well before inauguration day the new president should prepare his or her list of nominees for all key positions in the nation's science infrastructure, and particularly the role of science adviser. This individual, a distinguished science leader with skills as much managerial as scientific, should be standing on the steps of the US Capitol, along with the vice president and other luminaries, while the president is sworn in. Then in the presidency's first 180 days, the "First Scientist" should be publicly tasked with the following charge: Lead a government-wide investigation of the state of science, with particular emphasis on systemic issues that impede the use of science in decision making. The

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Sputnik led to sagging US confidence and profound fears about the nation's competitiveness. But Eisenhower, who had previously served as president of Columbia University, knew how to respond, quickly pulling the nation's top scientists into his inner circle and seeking their unfiltered advice. Before long he both appointed the first official presidential science adviser (MIT president James Killian) and launched the distinguished President's Science Advisory Committee. As Eisenhower later put it, "This bunch of scientists was one of the few groups that I encountered in Washington who seemed to be there to help the country and not to help themselves."

And following Eisenhower came another inspiring science president from a different party: John F. Kennedy. When Kennedy spoke about science, he moved adults and schoolchildren alike to take an interest in space and other forms of exploration. Kennedy stoked the conviction that

president should pledge that the science adviser will have the full cooperation of other cabinet secretaries in this task—indeed, these secretaries should be instructed to conduct their own investigations and report to the science adviser.

These first steps will strongly convey the sense that the new administration takes science seriously. But that message must be incorporated into the president's agenda-setting rhetoric as well. During the first 180 days, as cabinet appointments are made and priorities outlined, the president will have the opportunity to express to the nation's scientists that he or she both respects and, indeed, needs them. The ultimate goal must be to reconstitute a federal government in which scientific expertise filters properly into decision making at all levels—a government, in short, that talented young scientists will *want* to come and work for.

The science deficit of the past administration won't turn into a surplus based solely upon these measures, however. The new president will also have to address the leading science-based issues of the day. One which will be in play as the next president takes office, the stem-cell debate, shouldn't pose huge difficulties. The unjustified restrictions placed on federally funded research—based upon misinformation uttered by the president in August 2001 about the number of stem-cell lines that would be available—were enacted through executive order. They can be reversed by the next office-holder.

In all likelihood, the greatest challenge for the new president will be to bring the United States into an international agreement to cap greenhouse-gas emissions at a level judged sufficient to stabilize the climate. Constant monitoring will be necessary to further ensure that the new caps are having the desired effect and that the climate isn't behaving even more sensitively than we thought. None of this will be easy, but the world is ready for a real greenhouse-gas treaty, and long *past* ready for a US president to lead on this front.

The new president should couple the joining of a global climate treaty with a new emphasis on energy policy at home—in particular, on energy and fuel efficiency, so that lower emissions won't

seem such a burden. Carbon taxes, tradable emissions credits, government subsidies for companies that invest in research to develop lower (or even zero-) emission technologies—all these tools must be considered and tested if we're to get ourselves back into the climate-safe zone. It's no exaggeration to say that if the next president can resolve the climate crisis, that may well be remembered as his or her greatest single achievement.

Other potential emerging science issues will carry the next president squarely into the territory of ethics. Imagine, for instance, the use of advances in neuroscience to bring brain scans into the criminal justice system to determine guilt or innocence, or the creation of human-great ape

controversial or speculative topics. They would be designed, at least in part, to spark discussion in the media, on the Sunday-morning talk shows, and also at the kitchen table.

As the nation heads full-bore into campaign season, then, the question becomes: What would America be like if science were permitted to inform decision making, and if scientific issues that concern the world's future were a natural part of a broad national conversation? To say that the country would be radically transformed is probably fair. But, more specifically, the nation would also be radically better equipped for what lies ahead, and primed to begin to behave successfully again as it did in the not-so-distant past.

No one party has a monopoly on science or reason, to be sure. But if there is indeed an "assault on reason" right now, and if science and reason matter more than ever before when it comes to setting the right policies in an increasingly complex and challenging world—which seems scarcely disputable—then one thing alone can rescue us. The next US president must use his or her office to restore a reasoned national dialogue—a dialogue that will embrace science as both a means and an end, one that will inevitably influence the national conversation, and subsequently spill over into all other walks of American life and its institutions.

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chimeras and synthetic minimal-genome organisms. Developments like these, perhaps not so far off, will powerfully challenge society, but meeting those challenges will be far easier if the next president seizes upon opportunities to "talk science" broadly and make it a central part of the democratic process.

To better grapple with emerging science controversies, one idea might be for the president to reconstitute something akin to Eisenhower's President's Science Advisory Committee, but with a strong emphasis on forecasting the looming problems of tomorrow. Nobel laureates, leaders of industry, presidents of universities, could comprise a group of 15 or 20 that meet with the president regularly for wide-ranging discussions. Indeed, the president's meetings with this group—accompanied by the science adviser, who should sit on the committee—could become a regular news ritual. The conversations wouldn't shy away from

Reason, logic, a consideration of fact, and healthy skepticism—all of which are tenets of the scientific approach—are critical to a successful democratic government. Democracies are enlivened and reinvigorated by the discussion of science and its implications, the challenges of which put democracy in action. And so we *must* have a president who can use the office to prepare the US for the scientific quandaries that are hurtling toward us—and those that are already here.

One year from now America will elect a new leader. The nation deserves a president who will recognize the potential power of science to revive our sense of opportunity and our optimism, and, indeed, the American Dream. ∞